

Work Sheet

Our Reference No. PT-1949001

Applicants Name: Dialysis Solutions Inc.

Serial No. 10/020,882

Examiners Name: John D. Pak

Mass Balance for the components of dialysis composition.

Concentrate as specified contains:

g/L= gram /Litre

[NaCl] 90.72±9.0 g/L

[NaHCO₃] 28.35 ±2.8 g/L[MgCl₂] 0.96±0.9 g/L

Molecular weights (MW): from periodic table in Merck Index specified in grams/mole

[Na] = 22.989768 g/mol

[Cl] = 35.4527 g/mol

[Mg] = 24.3050 g/mol

[HCO₃]= (1.00794+12.011+3*15.9994) = 61.01714 g/mol

To determine the ion concentrations in the dialysis solution

Breaking [NaCl] into its ion components by weight:

[Na] part: 90.72 / (22.989768+35.4527)* 22.989768= 35.68692 g

[Cl] part: 90.72-35.68692= 55.03308g

Breaking [MgCl₂] into its ion components by weight:

[Mg] part: 0.96/ (24.3050+35.4527*2)* 24.3050=0.245066g

[Cl] part: 0.96-0.245066=0.7149g

Breaking [NaHCO₃] into its ion components by weight:

[Na] part: 28.35/ (22.989768+61.01714)*22.989768=7.758409 g

[HCO₃] part: 28.35-7.758409= 20.5915g

Total Mass of ions per Litre of concentrated solution from above

[Na] : 35.68692 g+7.758409 g=43.44533 g

[Mg] : 0.245066 g

[Cl] : 55.03308g + 0.7149g = 55.74798g

[HCO₃]: 20.5915 g

Using 80 ml (0.08L) of the solution added to 1 Litre of water the following content of in the dialysis solution will be achieved:

$$[\text{Mg}]: \frac{0.245066 \text{ g} / \text{L} * 0.08 \text{ L} * 1000 \text{ mmol/mol}}{1.08 \text{ L} * 24.3050 \text{ g/mol}} = 0.746 \text{ mmol/L} \text{ or } .75 \pm 10\% \text{ mmol/L}$$

$$[\text{Cl}]: \frac{55.74798 \text{ g} / \text{L} * 0.08 \text{ L} * 1000 \text{ mmol/mol}}{1.08 \text{ L} * 35.4527 \text{ g/mol}} = 116.48 \text{ mmol/L} \text{ or } 116 \pm 10\% \text{ mmol/L}$$

$$[\text{Na}]: \frac{43.44533 \text{ g} / \text{L} * 0.08 \text{ L} * 1000 \text{ mmol/mol}}{1.08 \text{ L} * 22.989768 \text{ g/mol}} = 139.98 \text{ mmol/L} \text{ or } 140 \pm 10\% \text{ mmol/L}$$

$$[\text{HCO}_3]: \frac{20.5915 \text{ g} / \text{L} * 0.08 \text{ L} * 1000 \text{ mmol/mol}}{1.08 \text{ L} * 61.01714 \text{ g/mol}} = 24.998 \text{ mmol/L} \text{ or } 25 \pm 10\% \text{ mmol/L}$$

PERIODIC CHART OF THE ELEMENTS

+1 H 1.0074 -1	2/Ha
Common Oxidation States → +1 +2 +3 +4	
+1 Li 6.94 -2	3/Be
+1 Li 6.94 -2	9.017182 -2.2
+1 Li 6.94 -2	12/

Atomic Weight →	+1 +2 +3 +4	79	— Atomic Number
Electron Configuration →	+1 +2 +3 +4	196.966569	← Atomic Symbol
of Outer Shells		-32-18-1	

+1 Li 6.94 -2	13/Al	35.451	He 4.00602 2
+1 Na 22.9897693 -2.8	14/Si	39.943	Ar 39.943 2.8
+1 Mg 24.31050 -2.8	15/P	35.451	
+1 Ca 40.078 -2.8	16/S	32.063	
+1 Sc 44.95912 -3.9	17/Cl	30.973762	
+1 Ti 46.95115 -3.9	18/Br	30.973762	
+1 Cr 54.93805 -3.9	19/Kr	36.91536	
+1 Mn 55.853 -3.9	20/Ar	32.063	
+1 Fe 56.693 -3.9	21/Ar	32.063	
+1 Co 58.93195 -3.9	22/Ar	32.063	
+1 Ni 58.693 -3.9	23/Ar	32.063	
+1 Cu 63.546 -3.9	24/Ar	32.063	
+1 Zn 65.409 -3.9	25/Ar	32.063	
+1 Ga 69.733 -3.9	26/Ar	32.063	
+1 Ge 72.64 -3.9	27/Ar	32.063	
+1 As 73.96 -3.9	28/Ar	32.063	
+1 Se 75.94 -3.9	29/Ar	32.063	
+1 Br 79.98 -3.9	30/Ar	32.063	
+1 Kr 83.83 -3.9	31/Ar	32.063	
+1 Rb 87.62 -3.9	32/Ar	32.063	
+1 Sr 88.90653 -3.9	33/Ar	32.063	
+1 Y 91.224 -3.9	34/Ar	32.063	
+1 Nb 92.90653 -3.9	35/Ar	32.063	
+1 Mo 95.94 -3.9	36/Ar	32.063	
+1 Ru 101.97 -3.9	37/Ar	32.063	
+1 Rh 102.91550 -3.9	38/Ar	32.063	
+1 Pd 106.42 -3.9	39/Ar	32.063	
+1 Ag 107.8882 -3.9	40/Ar	32.063	
+1 Cd 112.411 -3.9	41/Ar	32.063	
+1 In 114.518 -3.9	42/Ar	32.063	
+1 Sn 118.710 -3.9	43/Ar	32.063	
+1 Sb 121.760 -3.9	44/Ar	32.063	
+1 Te 127.60 -3.9	45/Ar	32.063	
+1 I 131.203 -3.9	46/Ar	32.063	
+1 Xe 131.203 -3.9	47/Ar	32.063	
+1 Rn 131.203 -3.9	48/Ar	32.063	
+1 Ra 162.260 -3.9	49/Ar	32.063	
+1 Fr 164.921 -3.9	50/Ar	32.063	
+1 Ra 166.121 -3.9	51/Ar	32.063	
+1 Ra 166.121 -3.9	52/Ar	32.063	
+1 Ra 166.121 -3.9	53/Ar	32.063	
+1 Ra 166.121 -3.9	54/Ar	32.063	

+1 La 18.9047 -3.9	55/Hf	134/He	134/He
+1 Ce 140.116 -3.9	56/Pr	141/Ne	141/Ne
+1 Nd 144.942 -3.9	57/Pm	147/Ar	147/Ar
+1 Sm 150.116 -3.9	58/Eu	154/Er	154/Er
+1 Gd 151.956 -3.9	59/Gd	158.95355	158.95355
+1 Tb 157.235 -3.9	60/Tb	162.00	162.00
+1 Dy 158.95355 -3.9	61/Dy	164.9502	164.9502
+1 Ho 167.239 -3.9	62/Ho	167.239	167.239
+1 Er 168.95355 -3.9	63/Er	168.95355	168.95355
+1 Tm 170.00 -3.9	64/Tm	170.00	170.00
+1 Yb 174.967 -3.9	65/Yb	174.967	174.967
+1 Lu 176.967 -3.9	66/Lu	178.967	178.967
+1 Hf 178.967 -3.9	67/Hf	180.967	180.967
+1 Ta 180.967 -3.9	68/Ta	182.967	182.967
+1 W 183.967 -3.9	69/W	184.967	184.967
+1 Re 186.207 -3.9	70/Re	186.207	186.207
+1 Os 190.213 -3.9	71/Os	192.217	192.217
+1 Pt 195.084 -3.9	72/Pt	196.95569	196.95569
+1 Au 196.95569 -3.9	73/Au	200.95569	200.95569
+1 Hg 200.95569 -3.9	74/Hg	204.95569	204.95569
+1 Tl 207.2 -3.9	75/Tl	207.2	207.2
+1 Pb 208.95569 -3.9	76/Pb	208.95569	208.95569
+1 Bi 208.95569 -3.9	77/Bi	208.95569	208.95569
+1 Po 208.95569 -3.9	78/Po	208.95569	208.95569
+1 At 208.95569 -3.9	79/At	208.95569	208.95569
+1 Rn 222.076 -3.9	80/Rn	222.076	222.076
+1 Fr 223.076 -3.9	81/Fr	223.076	223.076
+1 Ra 225.076 -3.9	82/Ra	225.076	225.076
+1 Ra 226.076 -3.9	83/Ra	226.076	226.076
+1 Ra 227.076 -3.9	84/Ra	227.076	227.076
+1 Ra 228.076 -3.9	85/Ra	228.076	228.076
+1 Ra 229.076 -3.9	86/Ra	229.076	229.076
+1 Ra 230.076 -3.9	87/Ra	230.076	230.076
+1 Ra 231.076 -3.9	88/Ra	231.076	231.076
+1 Ra 232.076 -3.9	89/Ra	232.076	232.076
+1 Ra 233.076 -3.9	90/Ra	233.076	233.076
+1 Ra 234.076 -3.9	91/Ra	234.076	234.076
+1 Ra 235.076 -3.9	92/Ra	235.076	235.076
+1 Ra 236.076 -3.9	93/Ra	236.076	236.076
+1 Ra 237.076 -3.9	94/Ra	237.076	237.076
+1 Ra 238.076 -3.9	95/Ra	238.076	238.076
+1 Ra 239.076 -3.9	96/Ra	239.076	239.076
+1 Ra 240.076 -3.9	97/Ra	240.076	240.076
+1 Ra 241.076 -3.9	98/Ra	241.076	241.076
+1 Ra 242.076 -3.9	99/Ra	242.076	242.076
+1 Ra 243.076 -3.9	100/Ra	243.076	243.076
+1 Ra 244.076 -3.9	101/Ra	244.076	244.076
+1 Ra 245.076 -3.9	102/Ra	245.076	245.076
+1 Ra 246.076 -3.9	103/Ra	246.076	246.076
+1 Ra 247.076 -3.9	104/Ra	247.076	247.076
+1 Ra 248.076 -3.9	105/Ra	248.076	248.076
+1 Ra 249.076 -3.9	106/Ra	249.076	249.076
+1 Ra 250.076 -3.9	107/Ra	250.076	250.076
+1 Ra 251.076 -3.9	108/Ra	251.076	251.076
+1 Ra 252.076 -3.9	109/Ra	252.076	252.076
+1 Ra 253.076 -3.9	110/Ra	253.076	253.076
+1 Ra 254.076 -3.9	111/Ra	254.076	254.076
+1 Ra 255.076 -3.9	112/Ra	255.076	255.076
+1 Ra 256.076 -3.9	113/Ra	256.076	256.076
+1 Ra 257.076 -3.9	114/Ra	257.076	257.076
+1 Ra 258.076 -3.9	115/Ra	258.076	258.076
+1 Ra 259.076 -3.9	116/Ra	259.076	259.076
Noble Gases			

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Note: Atomic weights are based on the 2001 IUPAC Atomic Weights of the Elements and the 2005 Revised IUPAC Periodic Table of the Elements. Values in parentheses are used for certain radionuclides; this value is the relative atomic mass of the isotope of that element of longest known half-life.

Note: Elements with atomic numbers 112 and above have been reported but not fully authenticated.

* Symbols based on IUPAC systematic names